April 10, 2017

Mr. Pat O'Brien
Hydrokinetics, Inc.
12975 West 24th Place
Golden, CO 80401

RE: Formation Connate Water Total Dissolved Solids
Dakota Group and Injection Intervals
ECCV DI-2
Weld County, Colorado

Dear Mr. O'Brien:

Please find attached the total dissolved solids (TDS) estimates for the requested formations. The TDS values determined for the additional sands in the Dakota group were based on the ECCV DI-1 well logs. For the Lyons and deeper formations, a baseline calculation was done with the ECCV DI-1 logs and samples and the same parameters were then applied to the ECCV DI-2 logs to determine the TDS.

Please do not hesitate to call me at 720-420-5712 if you have any additional questions or comments.

Sincerely,

Scott Patrick
Petroleum Engineer

Attached: *Summary Report*
Connate Brine Resistivity Calculations

Methodology

The total dissolved solids for the Sussex member of the Pierre Shale, the D and J Sands in the Dakota Group and the Entrada formation were previously calculated determined from a method utilizing Archie's equation. The same method was utilized in these estimates.

It should be noted that specific intervals were selected for calculation to achieve a more reliable and accurate estimate. Intervals with lower gamma ray readings were targeted as this generally indicates an absence of clays. Clays will impact the resistivity response such that the model assumptions are invalidated. The calculations are also less sensitive at higher porosities so these intervals were identified where possible.

Dakota Group Results

The gamma ray log from the CBL was utilized to correlated sands present in the DI-2 to the DI-1 well. The TDS of these intervals were then calculated using the DI-1 open hole logs. The results of the TDS estimates from the Dakota group are provided in Table A1. The previous D and J Sand calculations were also included. The average total dissolved solids for the formation connate water in the Dakota group is 20,625 ppm (including the D and J).

The presence of hydrocarbons was identified in the DI-1 mud log in a few intervals within the Dakota group. Without knowledge of the hydrocarbon saturation, the presence of trace amounts of hydrocarbons can influence the apparent connate water resistivity calculation, resulting in inaccurate TDS values. These intervals were not included.

Note that the cementation exponent was based on an average of the Dakota values determined from the previous analysis.

Injection Interval Results

The use of kill fluids during the ECCV DI-2 completion appears to have contaminated the water samples obtained in several intervals. To verify the results, TDS calculations were performed on the ECCV DI-2 logs to provide additional information on the samples obtained.

The ECCV DI-1 log and water samples were utilized to establish the values for the cementation exponent so that these values could be used in the ECCV DI-2 calculations. The results of the calculations for the ECCV DI-1 are provided in Table A2.

The results of the ECCV DI-2 calculations are provided in Table A3. The Lyons and Admire calculated TDS values were lower than the water sample obtained from the well, but for the Wolfcamp, Amazon and Council Grove, the calculations were higher.

Other Methodologies

The other few methodologies for determining formation water TDS are generally not applicable or recommended for this situation. The other option that utilizes well logs is based on the spontaneous potential (SP), but has limitations in its application. The two factors that make it difficult to apply in this situation are related to the bed thicknesses and the presence of highly resistive. The SP measurement

requires a clean bed thickness greater than 20 feet before it reaches its full deflection, which is not common for the evaluated formations and would require a correction factor to be applied. More importantly, the presence of highly resistive formations is further limiting as it alters the measurement in the formation, preventing accurate readings. The injection intervals contain a significant amount of highly resistive beds. As such, this method is not recommended in this application.

Table A1: ECCV DI-2 - Estimated Total Dissolved Solids for Dakota Sands from ECCV DI-1 Data.

Formation Name	Dakota - D Sand	Dakota - J-Sand	Dakota	Dakota
Top of Calculated Interval (ft)	7,926	8,010	8,216	8,288
Bottom of Calculated Interval (ft)	7,930	8,020	8,220	8,296
Water Sample Total Dissolved Solids (ppm)	- -	- -	- -	- -
True Formation Resistivity (ohm.m)	65.0	13	6	3.5
Formation Porosity (%)	4%	13%	14%	18%
Temperature (°F)	255	257	262	264
Tortuosity Factor, a (-)	1.00	1.00	1.00	1.00
Cementation Exponent, m (-)	2.18	2.14	2.16	2.16
Formation Water Saturation, S_w (%)	100%	100%	100%	100%
Connate Brine Resistivity, R_w @ Formation Temperature (ohm.m)	0.06	0.17	0.09	0.09
Estimated Total Dissolved Solids (ppm)	32,000	10,500	20,000	20,000

Table A2: ECCV DI-1 - Estimated Total Dissolved Solids for the Injection Interval.

Formation Name	Lyons	Wolfcamp	Amazon	Council Grove	Admire	Virgil	Missouri
Top of Calculated Interval (ft)	9,190	9,560	9,620	9,702	9,810	9,960	10,010
Bottom of Calculated Interval (ft)	9,200	9,570	9,630	9,706	9,820	9,970	10,020
Water Sample Total Dissolved Solids (ppm)	17,700	17,900	15,800	15,800	- -	- -	21,000
True Formation Resistivity (ohm.m)	60	15	50	12	35	70	30
Formation Porosity (%)	5%	8%	5%	12%	7%	4%	9%
Temperature (°F)	285	294	295	297	300	303	304
Tortuosity Factor, a (-)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cementation Exponent, m (-)	2.17	2.02	2.08	2.25	2.21	2.21	2.50
Formation Water Saturation, S_w (%)	100%	100%	100%	100%	100%	100%	100%
Connate Brine Resistivity, R_w @ Formation Temperature (ohm.m)	0.09	0.09	0.10	0.10	0.10	0.06	0.07
Estimated Total Dissolved Solids (ppm)	18,000	18,000	15,500	15,500	15,500	26,000	21,000

Table A3: ECCV DI-2 - Estimated Total Dissolved Solids for the Injection Interval.

Formation Name	Lyons	Wolfcamp	Amazon	Council Grove	Admire	Virgil	Missouri
Top of Calculated Interval (ft)	9,135	9,550	9,600	9,676	9,760	9,897	10,040
Bottom of Calculated Interval (ft)	9,152	9,560	9,610	9,680	9,766	9,901	10,060
Water Sample Total Dissolved Solids (ppm)	59,000	16,900	16,900	16,900	76,500	- -	- -
True Formation Resistivity (ohm.m)	60	50	20	4	20	250	100
Formation Porosity (%)	4%	4%	7%	14%	10%	2%	4%
Temperature (°F)	286	296	298	299	301	305	308
Tortuosity Factor, a (-)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cementation Exponent, m (-)	2.17	2.02	2.08	2.25	2.21	2.10	2.50
Formation Water Saturation, S_w (%)	100%	100%	100%	100%	100%	100%	100%
Connate Brine Resistivity, R_w @ Formation Temperature (ohm.m)	0.06	0.08	0.08	0.05	0.12	0.07	0.03
Estimated Total Dissolved Solids (ppm)	28,000	19,000	20,000	34,000	12,500	24,000	57,000